Novel Signals Intercept Method for Overcoming Late-Generation Transmitter Shielding: Polarity-Comparative Phase Prolongation Interferometric Analysis

25 June 2023
Simon Edwards
Research Acceleration Initiative

Introduction

In addition to detecting gravity waves (neutrino waves) that have their origins in deep space, LASER interferometers have an unexplored application in the area of signals intercept. While traditional gold/beryllium neutrino detectors are useful for triangulating signal sources for satellite detection (for instance,) these detectors have deficiencies in the area of lossless signal capture; an essential capability for facilitating decryption of adversary signals.

This deficiency has not been a major problem for programs dealing in neutrino intercept for the purpose of analog neurological-source signals into useful digital images since the intercept of each and every bit of available data is not critical for that application i.e. analog signals have far greater loss- tolerance particularly when cryptography is not a factor.

Recent advancements in the area of antenna shielding have meant that, for roughly the last decade, developed nations have had the capacity to ensure a high degree of collimation of microwave-band signals that leave little to no useful electromagnetism available for intercept. In fact, the degree of collimation is so great, in most cases, that these beams fall entirely within the surface area of receiver dishes; enabling the same EM shielding material used in the antenna to be used as a backing for the receiver dish. This has rendered orbital U.S. SIGINT platforms designed for the intercept of ground-to-ground microwave transmission mostly obsolete when dealing with near-peer adversaries.

Since all electromagnetic activity creates, as a byproduct, neutrino waves and given that neutrinos may not be meaningfully blocked by any known method, the detection of artificial neutrino emissions associated with radio may be a practical avenue for signals intercept where antennae shielded by advanced methods would otherwise stymie intercept.

Abstract

LASER interferometers, provided that multiple such emitters/receivers are arrayed to facilitate triangulation and designed to fire ultrashort pulses consisting of a single phase of light of individually calibrated polarity and that said interferometers are deployed under controlled, seismically stable conditions, may be used to detect influences upon in-flight photons caused by low-intensity neutrino waves associated with EM emissions, even in cases in which no classical electromagnetism is present at the site of the interferometer. Such an interferometer would not serve to directly detect EM of any sort, but would

instead exclusively detect neutrinos while being largely undisturbed by classical EM. This may even be advantageous vis á vis other methods given that a gold/beryllium neutrino detector requires EM-quiet as well as ultra-cold temperatures to perform its primary function.

This may be achieved through the analysis of the time-of-flight of the LASER pulses over extremely short distances. Importantly, neutrino (or gravity) waves do not slow the passage of light by bending space as certain theories of physics predict. Light is, in the case of gravity waves, instead slowed as a result of the tendency of neutrino uptake to alter the spin speed and direction of the photons. Light's property of phase is governed by the cyclical spin direction alternation of photons in which spin is maximal at mid-phase and is briefly zero at the peaks of phase, at which time, it inverts in direction, spinning in a counter-Magnusian fashion i.e. they always spin in the opposite direction of the direction of phase. It can therefore be predicted that a neutrino wave would be capable of prolonging individual phases of light by causing the photons to "corkscrew" as they phase. This corkscrewing of the photons means that the photons traveling between the photon source in the interferometer and the detector are forced to take a less-direct path and thus take a fraction of a femtosecond longer to arrive at the detector. For modern precision timing, this type of measurement is a trifling matter.

Given the ability of neutrinos to pass through the Earth, itself, the ubiquitous use of radio has as its consequence that such a detection system would have to contend with a great deal of unwanted interference. Indeed, the chief difficulty in operating such a system would be in filtering out all non-target signal sources. The first step in achieving this goal would be to control not only the angular momentum but the polarity of the interferometer's pulses. Importantly, light that has a polarity (phase direction) that is perpendicular to a neutrino source would not be affected (in terms of linearity of flight) by that source. Light with a polarity that is parallel with the neutrino source would be affected maximally. Light with a polarity that is diagonal relative to a neutrino source would be affected exactly half as much as the parallel-polarity light. To be clear, what I refer to as parallel-polarity light is light that has an angular momentum (overall direction of travel) that is at a right angle to the signal source and which has that orientation of polarity which causes its photons to undulate toward and away from the signal source. At 90 degrees of offset from this orientation would be the perpendicular orientation; the polarity that would, when the overall angular momentum of the light is at a right angle to the signal source, would cause the light to phase so that its undulations bring it neither farther away from nor closer to the source. It is easy to understand why this corkscrewing occurs when you understand that photons and electrons "want" to have their east and west poles facing toward neutrino sources. Should those poles already be facing in the direction of such a source (as they are when the phase direction is at right angles relative to the source,) there would be no change to spin, phase, or linearity of flight and thus no change to the relative arrival time of photons in an interferometer.

This means that comparing the arrival time of light of varying angular momentum and polarity in arrayed interferometers may be used to not merely triangulate, but to successfully and losslessly reconstruct the original radio signal associated with the neutrino emission detected.

Complete certainty as to the geospatial point of origin of neutrinos would depend upon operating identical sets of interferometers at multiple sites so that data may be compared according to arrival time of waves. Once a geospatial signal source is isolated, even X-band transmitters which rapidly alternate transmission frequency could be effectively eavesdropped upon since noise filtering would be based upon geospatial point of origin and not exclusively upon frequency.

Conclusion

This first-of-its-kind methodology for neutrino-to-EM signal reconstruction is unlikely to be anticipated by adversaries and given that it may be affordably prototyped, the strategic benefit implied renders the concept deserving of further development.